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NESTING BIOLOGY OF THE BEE *SVASTRA SABINENSIS* (HYMENOPTERA, ANTHOPHORIDAE)

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Abstract.—A single nest of *Svastra sabinensis sabinensis* (Cockerell) is described, illustrated, photographed, and compared with the nests of *Svastra obliqua* (Say), the only other member of the genus whose nest has been described. *Svastra sabinensis sabinensis* is ground nesting, with a branched, meandering burrow descending to approximately 80 cm, at which level numerous cells occur. Cells are vertical, elongate, and lined with a non-waxlike waterproof lining. Unlike in any other anthophorid bee, parts of the nest are plugged with sorted pebbles, presumably by the females associated with this nest, and a single specimen of the cuckoo bee *Triepeolus penicilliferus* (Brues) was collected while trying to enter the nest. This is the first association of *T. penicilliferus* with any host.

While searching for nests of various bees at Corona de Tucson, a small development about twenty miles southeast of Tucson, Pima County, Arizona, I discovered and excavated a nest of *Svastra sabinensis sabinensis* (Cockerell) on August 27 and 28, 1982. Dr. Wallace E. LaBerge, who kindly identified two females associated with the nest, suggested that my fragmentary observations would be of interest because so little has been published on the nests of any species in the genus. Only Rau (1922), Custer (1928, 1929) and Rozen (1964) have contributed nesting information heretofore, all authors reporting on *Svastra obliqua* (Say). Like that species, *Svastra sabinensis* belongs to the subgenus *Epimelissodes,* but its range is much more limited, and the nominate subspecies is known only from Arizona and New Mexico (LaBerge, 1956).

The single isolated nest penetrated the nearly horizontal ground (Fig. 1) where there was no shade, although *Cercidium, Echinocactus,* several species of *Opuntia,* and other typical Sonoran desert plants were abundant. The entrance was open, without turret, and not situated near any prominent marker such as a stone, and it was not surrounded by a tumulus. The main shaft (Fig. 3), circular, about 6 mm in diameter, unlined by any secretion,

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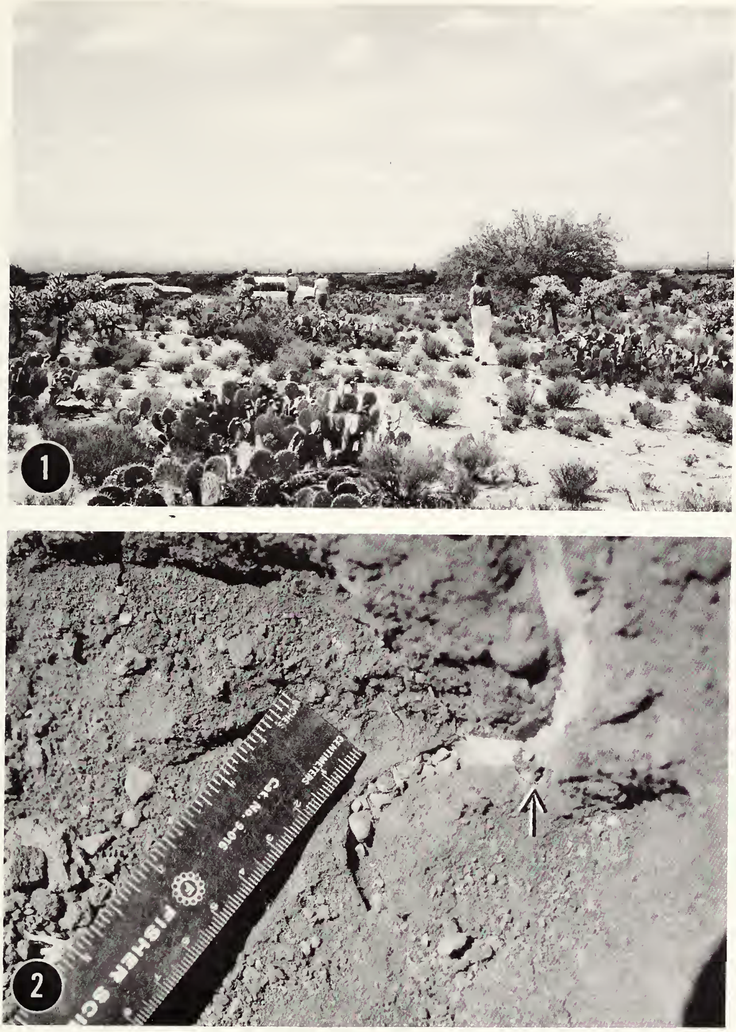
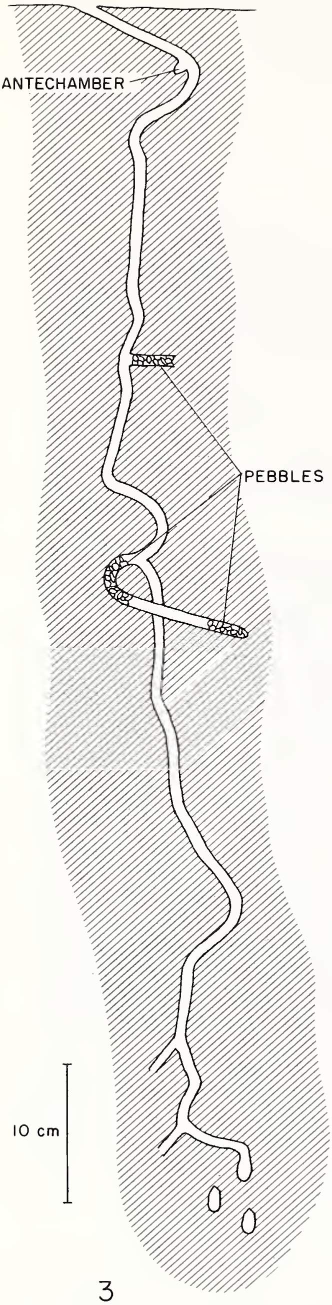


Figs. 1, 2. 1. Nesting locale of *Svastra sabinensis sabinensis* at Corona de Tucson, showing characteristic vegetation. 2. Section of nest of *Svastra sabinensis sabinensis* showing pebbles blocking curved branch, side view. Arrow marks point of attachment of main descending branch with pebble filled one. White material in burrow above is dry, powdered plaster of paris, used by the author to follow burrow during excavation.

and without masoned walls, descended at about a 30° angle from the surface for about 8 cm, at which depth a short branch was attached, presumably an antechamber as described by Custer (1928) and Rozen (1964) for *Svastra obliqua*. Below the antechamber the main tunnel turned downward, with



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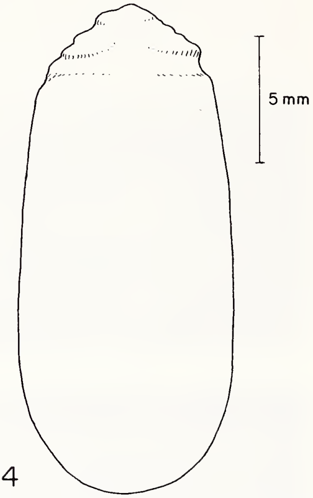

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Figs. 3, 4. 3. Schematic diagram of nest of *Svastra sabinensis sabinensis,* side view. 4. Diagram of cell lumen of same, made from plaster cast using camera lucida to depict exact shape, side view.

some meandering. At about the 25 cm level, a side tunnel branched, which was filled with rather large, sorted pebbles (Fig. 3). The side tunnel was lost and may have been filled with soil beyond the pebbles. Not having seen such a plug of pebbles in any anthophorid nest before, I postulated that a wasp might have constructed the tunnel using the *Svastra* burrow as an access tunnel. The open burrow continued to descend to about the 40 cm level, at which point it branched. One branch curved and was filled for about 4 cm, again with sorted pebbles (Fig. 2); then it was open for about 6 cm and then again plugged with pebbles for 3 cm more, after which it appeared to end blindly. The occurrence of pebble plugs at various places in this nest almost certainly indicated that the female bees occupying the nest had collected and deposited them, but their function, if any, is not clear. The other branch, completely open, descended, still meandering, to the approximate depth of 75 cm, where it branched and then branched again at 80 cm. One of the last branches, extending obliquely downward, ended in a vertical cell without rising before the cell entrance. In this vicinity four other cells were found near one another, all presumably arranged singly. Side tunnels leading to them were filled with soil and not discernible from the nesting substrate. Although I had hoped to find a cell arrangement similar to that diagrammed by Custer (1928) for *Svastra obliqua* or by Rozen (1974) for *Thygater analis* (Lepeletier), no such distinctive patterns could be identified.

The cells (Fig. 4) were elongate, with a broadly rounded bottom and a distinct, deeply concave closure. This closure, a well formed spiral with approximately five coils to the radius, possessed a rather poorly formed inner coil. This coil appeared to be less consolidated than that of the other rows. The plane of two such closures was tilted so that it was not at right angles to the long axis of the cell (not visible in profile drawn in Fig. 4). Unlike that of *Svastra obliqua* (Rozen, 1964), the cell wall did not appear to be plastered, but was slightly harder than the surrounding soil, suggesting that it had been either worked by the female or impregnated by her. It was very smooth and coated with a thin, somewhat shiny, transparent, non-waxlike material that was tan and translucent when viewed against a plaster cast made of the cell lumen. This lining extended to the cell closure, but not beyond, where the wall of the side tunnel was rough, not shiny, and readily absorbed water droplets.

Cells were 8.0 to 8.2 mm in maximum diameter (3 measurements) and the cast of one cell from apex of closure to bottom was 19 mm. The cell diameter at the closure was 6.5 mm (2 measurements).

A number of feeding immature larvae were recovered but none had reached the last instar. The provisions were orange, homogeneously moist but not liquid. As in *Svastra obliqua,* more than one female occupied a single nest. Two badly worn females were recovered from the nest, and a single *Tri-*

epeolus penicilliferus (Brues)[1] was collected while it was trying to enter the nest, although no eggs or larvae of the cuckoo bee were recovered. This is the first host record for *T. penicilliferus.*

Samples of cells, and the two female specimens, as well as the *Triepeolus penicilliferus* pinned with one of the females, are in the collections of the American Museum of Natural History.

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[1] Compared with specimens from the vicinity of Tucson, Arizona, identified by Dr. Paul D. Hurd, Jr.